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FY-66 Quarterly Report No. 3

PAR 233

28 Feb 66

SUBJECT: Zoom (6X to 60X) Project Lens for Monochromatic Light

TASK/PROBLEM

1. Investigate the possibility of designing a 6X to 60X Zoom Projection Lens for Monochromatic Light.

DISCUSSION

2. Further study of the problems experienced in designing the system has indicated that very "strong", high-aperture elements are needed for the approach described in the 30 Nov 65 Quarterly Report. Two additional arrangements are also being considered. The first of these would provide two zoom systems positioned in sequence through the projection system; otherwise, it is similar in concept to the original. The second arrangement uses five discrete assemblies along the axis. The first, third, and fifth assemblies are stationary; the second and fourth are movable to provide magnification change. No intermediate image is formed in this latter arrangement and it appears to require fewer and weaker elements than the others.

3. On 28 Feb 66, the contractor was visited by the customer's representative to review the progress and status of the project. During the review, the lens designers described the "first-order" studies which predict a system whose over-all length from film gate to screen is about 20 feet, and in which the optical assembly will be about 30 inches long, with elements ranging up to seven to eight inches in diameter. It is necessary to use high-index flint glass as a part of the system to provide corrections necessary for the 3500A to 4000A spectrum range. Most glasses of this type have very low transmittance below 3800A and 4000A.

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This condition, combined with the considerable length of glass-path through the high-index glass, may limit the transmittance of this system to the range of 2% to 10%. Data is being rechecked for one type of high-index glass which may have higher transmittance in that spectral range.

4. By reducing the spectral range for which the lens is corrected, it may be possible to use "lighter" flint glass which has higher transmittance in the UV. Correction for 3600A to 3700A to use 3650A light from a mercury arc source may permit this approach.

5. The customer's representative directed the contractor to delay further design effort until the customer could review other system elements such as the available gain in the image-amplifying-screen development.

PLANNED ACTIVITY

6. No further work will be done until the customer reviews the effect of the expected low optical system transmittance on over-all system performance.

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